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Tidal Marsh Inventories

Wetland scientists at the VIMS Center for Coastal Resources Management (CCRM) spent the last three summers conducting Tidal Marsh Inventories or TMIs. This issue of the Virginia Wetlands Report highlights this research by describing the process and why these inventories are important for management and sustainability of the Commonwealth's tidal wetland resources.

What are they?

Tidal Marsh Inventories contain maps and information about the size and location of vegetated tidal wetlands. A Tidal Marsh Inventory is completed for each coastal locality. Each Tidal Marsh Inventory has information about total marsh area, different marsh shapes, and various marsh plant communities within the locality.

Why are we doing them?

The Virginia Institute of Marine Science (VIMS) is obligated to continuously maintain and update an inventory of vegetated tidal wetlands in the Commonwealth (Section 28.2-1301, Code of Virginia). The VIMS Wetlands Advisory Program surveyed tidal wetlands in all coastal localities in the 1970's. In 1990, the tidal marshes in this original map series were converted to a digital format.

The VIMS Center for Coastal Resources Management began updating the Tidal Marsh Inventories in 2010. The main objective is to map the current locations and plant community types of tidal marshes throughout the Tidewater region. The TMI project is part of CCRM's ongoing shoreline inventory program that provides maps of several coastal features. In addition to tidal marshes, these features include riparian land uses, bank erosion conditions, shoreline defense structures such as bulkheads and revetments, and access structures such as piers and boat ramps. A shoreline management model also imports data from the TMIs to highlight sites where preferred living shoreline alternatives for erosion protection may be suitable.

How are we doing them?

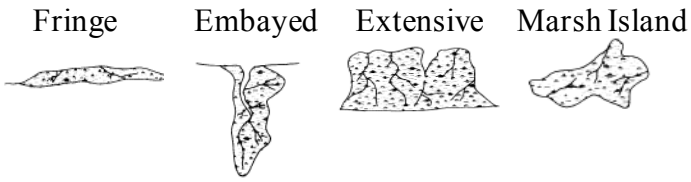
The process for generating Tidal Marsh Inventories is a CCRM team effort that combines remote sensing with field surveys to collect tidal marsh information. Visible tidal marsh boundaries are first traced or "digitized" onto high resolution infra-red aerial photographs using GIS software. Then field surveys are performed in shallow draft boats during the summer growing season. Map corrections are made and plant community attributes are coded after the field surveys. Quality assurance checks are completed to check for human and processing errors prior to publishing the final inventory maps.

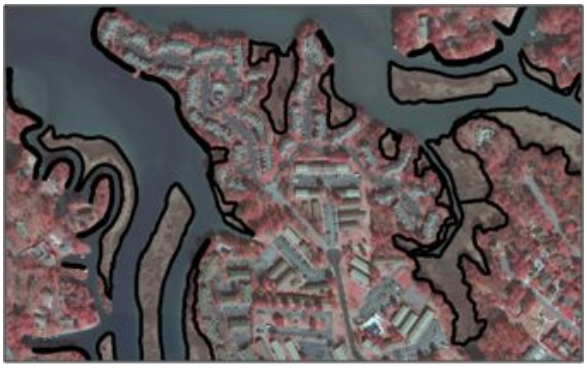
Extensive freshwater tidal marshes were surveyed on the Pamunkey River.

Tidal Marsh Inventory Process

1 Remote Sensing

- Digitize visible tidal marshes on high-resolution aerial photographs
- Code each marsh for general shape





Digitized tidal marshes outlined in black on infra-red aerial photo.

2 Field Surveys

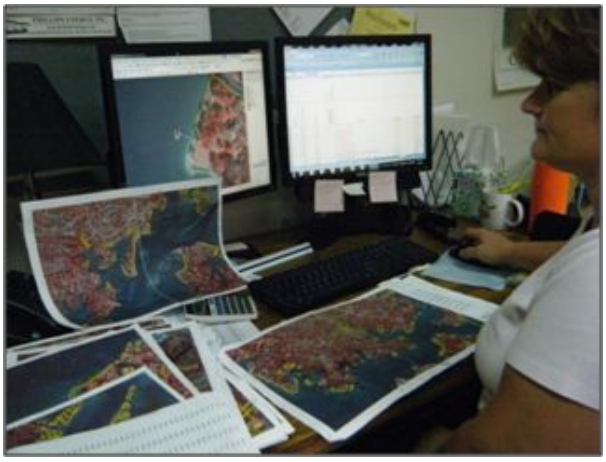
- Ground-truth mapped marshes
- Add new marsh areas not visible in aerial photographs
- Record visible plant species at each marsh

Karen Duhring ground-truthing maps in VA Beach

Julie Bradshaw identifying wetland plants on the York River

3 Map Corrections

- Digitize new marshes observed in field
- Delete areas that are not tidal marsh
- Merge plant species & community types into marsh attributes
- Quality assurance checks



Christine Tombleson making map corrections

What can be done with TMI information?

Different analyses can be performed once the inventory maps are completed, especially when they are combined with other shoreline inventory data. Changes to the dominant plant species and marsh community types over time indicate trends in surrounding conditions. For example, tidal marshes previously characterized by high marsh or freshwater plant species that are now dominated by low marsh or brackish plants may indicate changes in sea level and salinity. By making the GIS data available, other researchers can apply the TMI information to their own investigations.

Some of the current applications underway at CCRM are listed below with possible future studies.

CURRENT

- Locate & map tidal marsh areas for general interest
- Highlight potential living shoreline sites through a shoreline management model
- Evaluate trends in marsh area and types since 1970s
- Assess relationships with other sensitive habitats, e.g. forested riparian buffers, submerged aquatic vegetation (SAV), shellfish areas
- Examine the current distribution of *Phragmites australis* and other invasive species

FUTURE

- Compare baseline TMI with future surveys
- Track changing marsh landscape positions and loss due to sea level rise
- Target potential wetland restoration sites,Monitor marsh-dependent fish and wildlife population trends
- Track effectiveness of wetlands management efforts

Where have TMI field surveys been completed?

Locality	Field Survey Completed
City of Virginia Beach	2012
Westmoreland County	2012
Henrico County	2012
Fairfax County	2012
City of Alexandria	2012
Prince William County	2012
Mathews County	2012
Northampton County	2011
City of Hampton	2010
York – Pamunkey – Mattaponi Rivers	2010

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Tidal Wetlands News & Events

Sign up for VIMS e-News to receive announcements about upcoming events & seminars. *www.vims.edu*

Restore America's Estuaries annual conference. October 21-25, 2012. Tampa, FL *www.estuaries.org/conference*

Virginia Association of Professional Soil Scientists – VAPSS. Hydric Soil Indicators: Their History, Use and Applications. November 12-13, 2012. Airfield 4H Conference Center, Wakefield, VA. *www.vapss.org*

ACES and Ecosystem Markets conference. Ecosystem Services: Linking Science, Practice, and Decision Making. December 10-14, 2012. Ft. Lauderdale, Florida. *www.ecosystemcommons.org/event/aces-and-ecosystem-markets-2012*

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Where can you find the Tidal Marsh Inventories?

The final Tidal Marsh Inventory maps, reports, and GIS data will be made available at the CCRM web site (*ccrm.vims.edu*) as they are completed. The TMI data will also be incorporated into locality-based Comprehensive Coastal Resource Management Plans (CCRMPs). Each CCRMP draws information, strategies, and recommendations from a variety of resource management tools, including the Tidal Marsh Inventory.

The original Tidal Marsh Inventories from the 1970's are currently available for viewing or downloading, including the final reports (http://ccrm.vims.edu/publications/tidal_marsh_inventories.html) and the GIS data (*http://ccrm.vims.edu/gis_data_maps/static_maps/gis/tmi.html*).

For more information or assistance locating a Tidal Marsh Inventory, contact *Karen Duhring karend@vims.edu, 804-684-7159.*

Two invasive species in a Westmoreland County tidal marsh, including common reed Phragmites australis (left) and giant reed Arundo donax (right).